WELCOME

Where and When should I use the Oracle Service Bus (OSB)

Guido Schmutz

UKOUG Conference 2012

04.12.2012

BASEL   BERN   LAUSANNE   ZÜRICH   DÜSSELDORF   FRANKFURT A.M.   FREIBURG I.BR.   HAMBURG   MÜNCHEN   STUTTGART   WIEN

UK Oracle User Group
Conference 2012

ICC Birmingham
3rd–5th December | 2012
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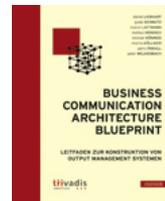Where and When should I use the Oracle Service Bus (OSB)
14.06.2012

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Guido Schmutz

- Working for Trivadis for more than 15 years
- Oracle ACE Director for Fusion Middleware and SOA
- Co-Author of different books
- Consultant, Trainer Software Architect for Java, Oracle, SOA and EDA
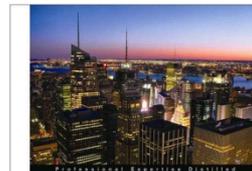- Member of Trivadis Architecture Board
- Technology Manager @ Trivadis

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Agenda

1. **Oracle Service Bus and Oracle SOA Suite**

2. Using the Oracle Service Bus

3. Bad Practices

4. Summary

Where and When should I use the Oracle Service Bus (OSB)
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Oracle Fusion Middleware

Applications

Middleware

Database

Infrastructure & Management

Development Tools

User Interaction

Enterprise Performance Management

Business Intelligence

Content Management

SOA & Process Management

Application Grid

Enterprise Management

Identity Management

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SOA Integration Suite

DESIGN   **SECURE**   **MANAGE MONITOR**   **PATTERN DETECTION**   **BUSINESS VISIBILITY**

DESIGN   **POLICY MANAGER**   **EM**   **CEP**   **BAM**

ORCHESTRATE

**BPEL PROCESS MGR
BUSINESS RULES
HUMAN WORKFLOW**

INTEGRATE VIRTUALIZE

ORACLE SERVICE BUS

Lifecycle Governance

ERP   **MAINFRAME**   **SERVICES**   **DB**   **PARTNERS**   **EVENTS**

Adapters & B2B

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OSB vs. Mediator vs. BPEL

Value Mapping
Cross-Reference Tables (XREFs)
Message Validation (Schematron)
Rule-engine for routing

Mediator 11g

Message Ordering

**Process State/
Long running**

Process Orchestration

Human Workflow

Decision Service

**BPEL/
BPMN**

Service Data Object (SDO)

**Compensation
Parallel Processing**

Sensors

EDN
Resubmit
Instance Monitoring
JDeveloper   SCA Support
Fault Management Framework
Unit Test Framework
Strong typing (XSD)

Security
XA Support
Message Filter
Message Validation (XSD)
Asynchronous Messaging Pattern
Message Transformation (XSLT)
Adapter Framework (JCA)
Message Routing

**Graphical Flow
Design**

Split-Join

Reliable Messaging

Service Types and Transport

Service Pooling (Load Balancing)

XQuery Transformation   **Message Throttling**

Result Set Caching   **REST Support**

OSB

Web Console   **Eclipse IDE**

Graphical Debugger

SLA Alert Rule

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Oracle Service Bus - Key Capabilities

Agility

Scalability and Performance

Oracle Service Bus

Rapid Service Enablement

Complete, Open & Integrated
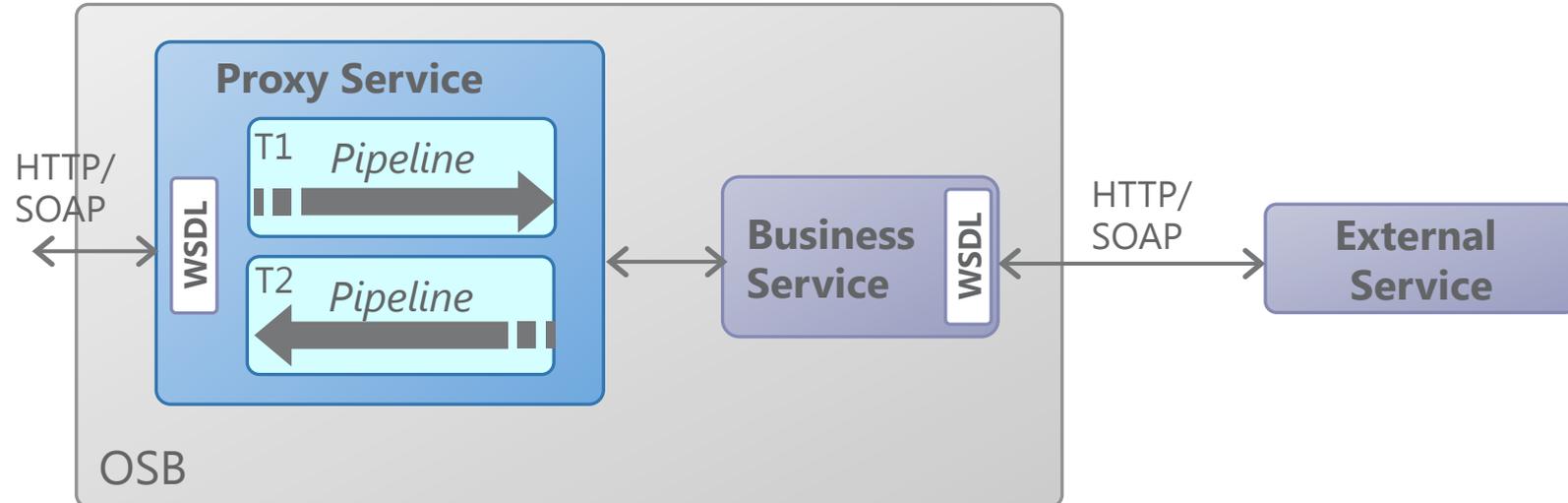
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Oracle Service Bus - Key Components

Proxy Service

- Contains the message processing logic for handling the request and the optional response message
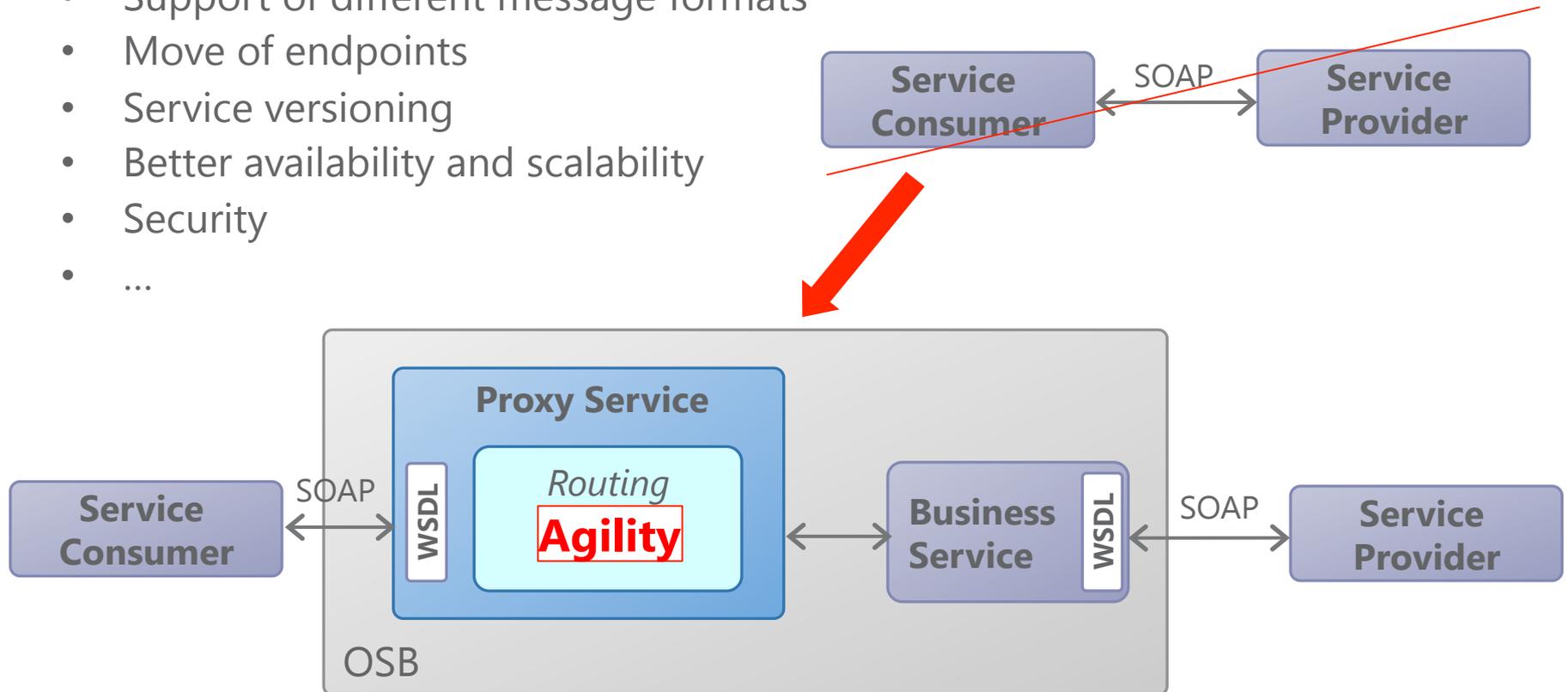
- Interface that the service consumer calls

Business Service

- Wraps the external systems the OSB calls

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Service Virtualization

- Create additional agility by replacing direct coupling and to provide a virtual endpoint for the consumer, with the following benefit
  - Support of different message formats
  - Move of endpoints
  - Service versioning
  - Better availability and scalability
  - Security
  - …

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Message Transformation

Requirement

- Different message format of inbound/outbound messages of the OSB

Solution

- Use a *Replace* action with an XQuery / XSLT script

- XQuery is a very efficient way to transform messages

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Routing

Requirement

- Efficiently route a message to one or another external service

Solution

- Use a *Conditional Branch* or a *Routing Table* instead of a single Routing action

- Pass routing criteria through headers if complex decisions involved (instead of programming it into the OSB flow)
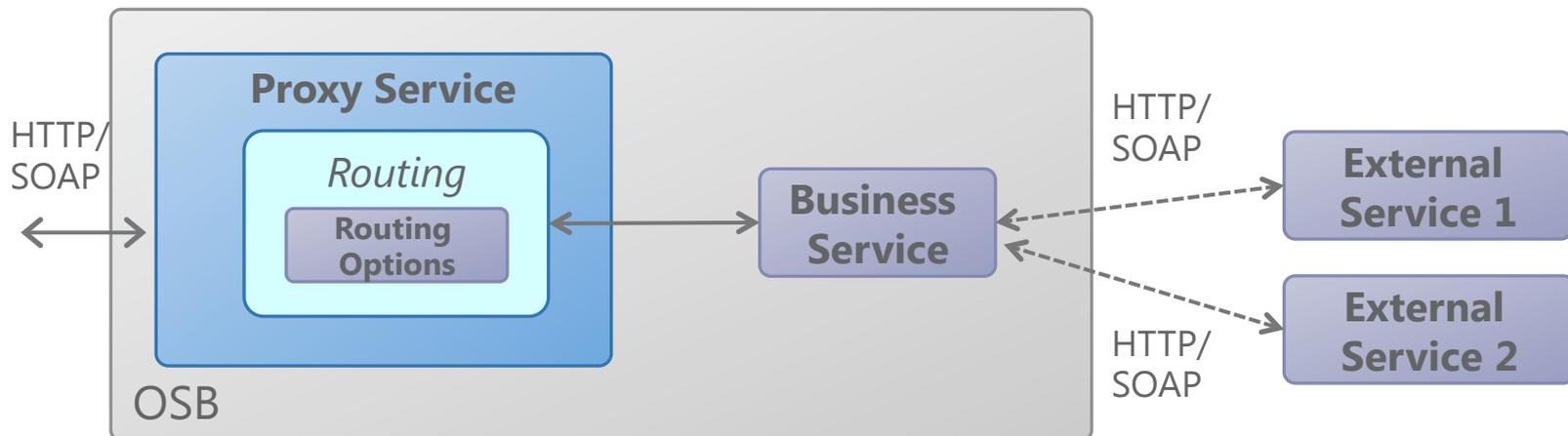 - Header based routing is more efficient if payload does not have to be touched at all

Dynamic Routing

Requirement

- Dynamically route a message to a service not known at development time

Solution

- Use a *Dynamic Routing* to dynamically invoke a different business service

- Set the Endpoint URI used on the business service dynamically through the *Routing Options* action
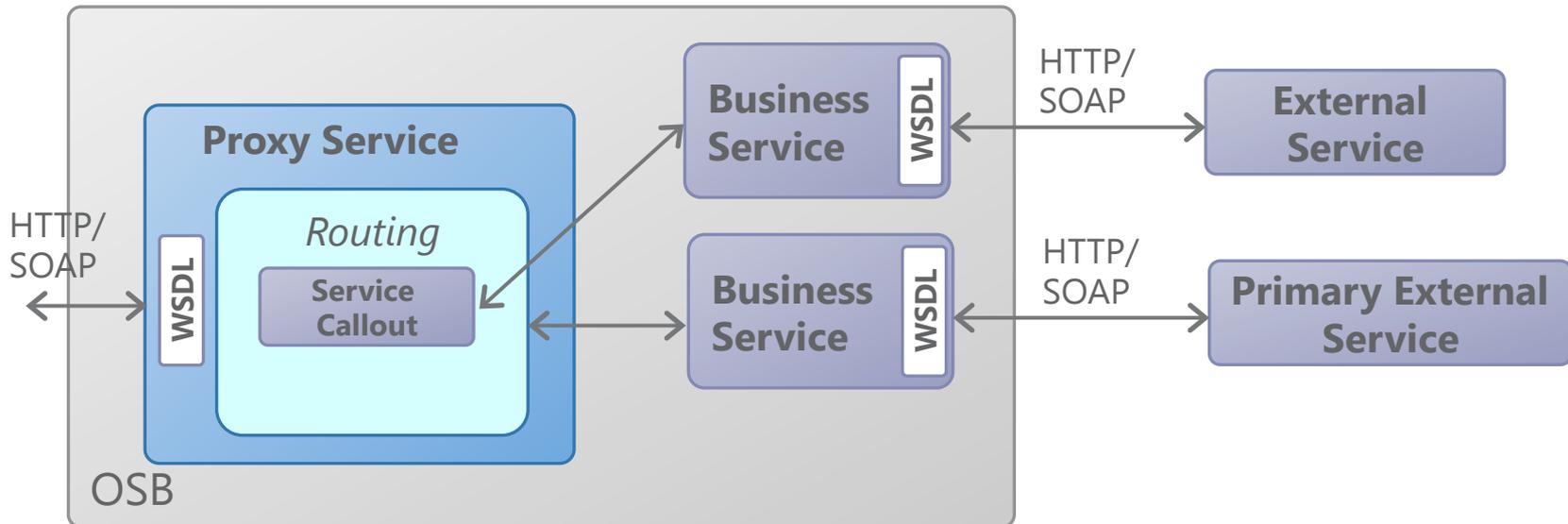 - All external services should implement the same contract

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Message Enrichment - Service Callout

Requirement

- Have to enrich a message before/after routing it to the primary service

Solution

- Use a *Service Callout* action either in the request/response flow of the *Routing* action
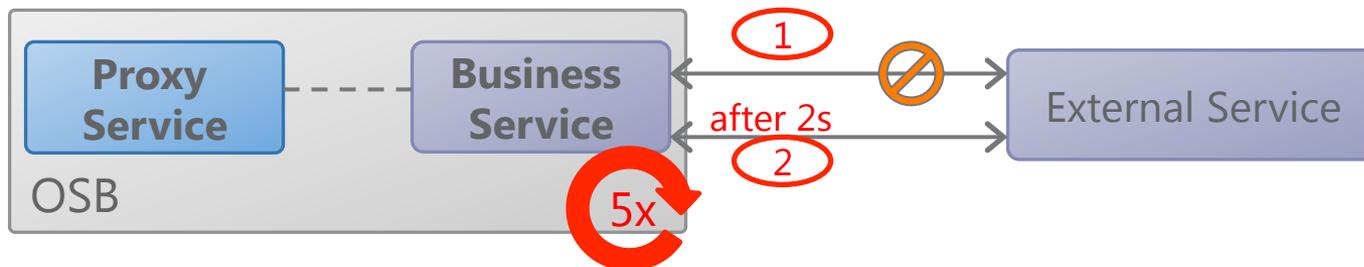
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Service-Pooling

Requirement

- Make link between consumer and service provider more reliable

Solution

- Use *Service Pooling* of OSB to handle short interruptions (network/ service)

- Number of retries and the time to wait can be configured

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Service-Pooling

Requirement

- Increase Scalability and Availability of a given service

Solution

- Use *Service Pooling* to link to multiple instances of a given service
  - Offers *load balancing algorithms* such as round-robin, random, random-weighted
  - If a URI is non-responsive, take the URI out of the pool
  - Bring the URI back in the pool when it is back-up

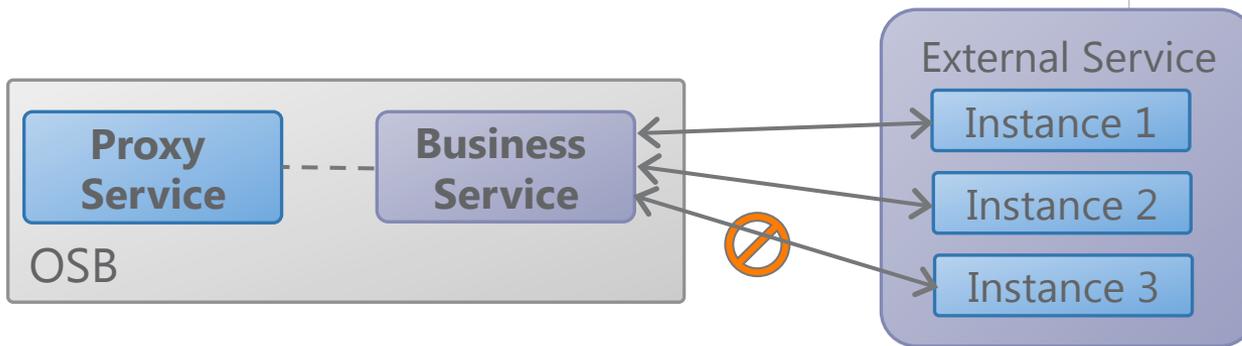**Transport Configuration**

Configuration

Use this page to configure the transport information for this service.

Protocol*	http
Load Balancing Algorithm	round-robin
Endpoint URI*	Format: http://host:port/someService

Existing URIs
http://localhost:8092/visa-card-ws-v3/v3
http://localhost:8093/visa-card-ws-v3/v3

External Service

Instance 1

Instance 2

Instance 3

Proxy Service

Business Service

OSB

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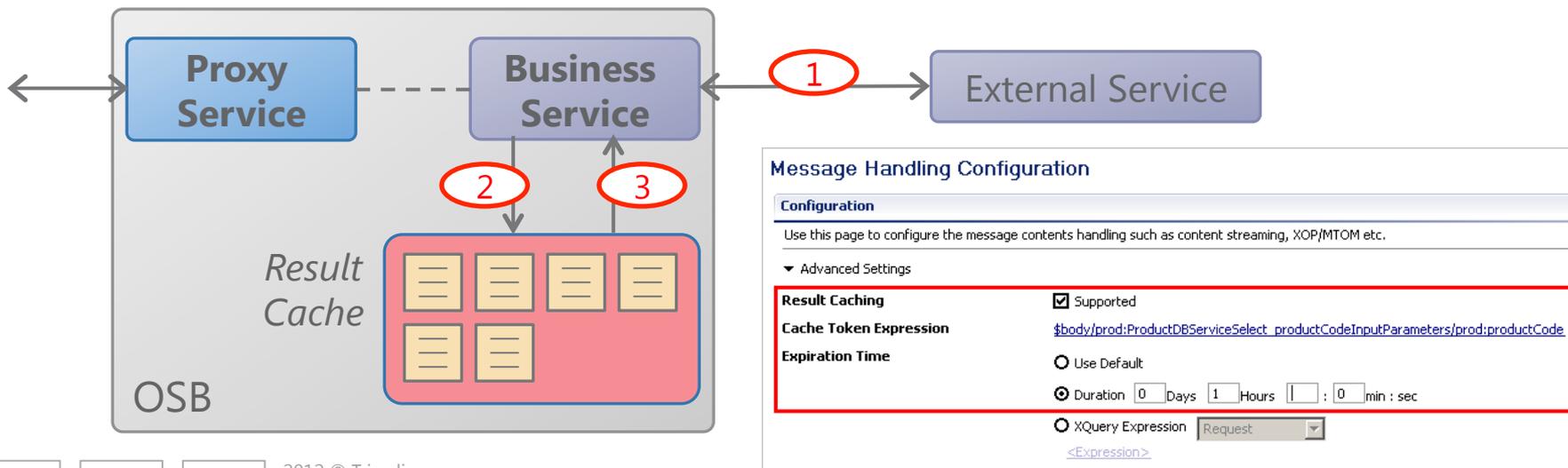
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Service Result Caching

Requirement

- Handle a lot of read-only calls to a system with limited capacity

Solution

- Use *Result Caching* to cache the information on the Oracle Service Bus

- Tune the Expiration Time settings to make sure the information is updated from time to time

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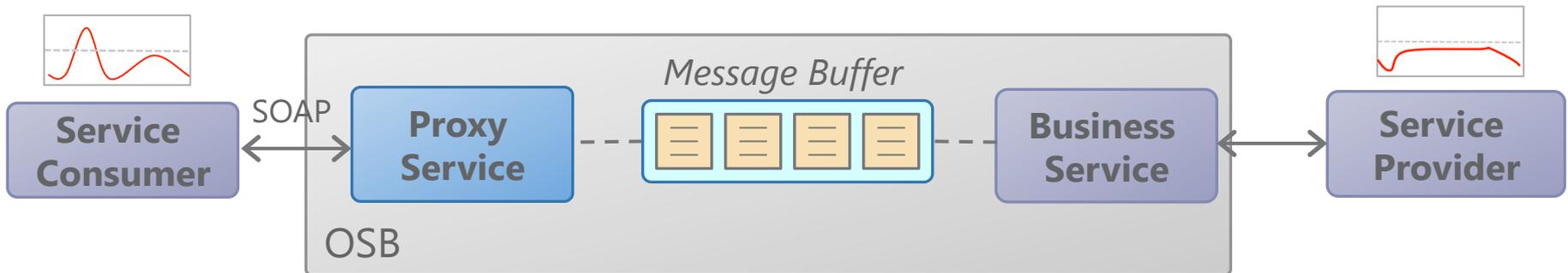
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Message Throttling

Requirement

- Make sure to not overload a system by sending too many messages

Solution

- Using *Message Throttling* feature of the Oracle Service Bus

Throttling	
Throttling State	☑ Enabled
Maximum Concurrency*	5
Throttling Queue*	100 messages
Message Expiration	0 msecs

Message Buffer

Service Consumer — SOAP — Proxy Service --- [Message Buffer] --- Business Service ↔ Service Provider

OSB

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Scalabilty and Performance - Work Manager vs. Throttling

- Work Manager with Proxy Service
    - Used to limit the number of threads running a proxy service

- Work Manager with Business Service
    - Used to limit the number of threads that process responses

- Throttling with Business Service
    - Only limits the load to backend services and avoids overloading the back end
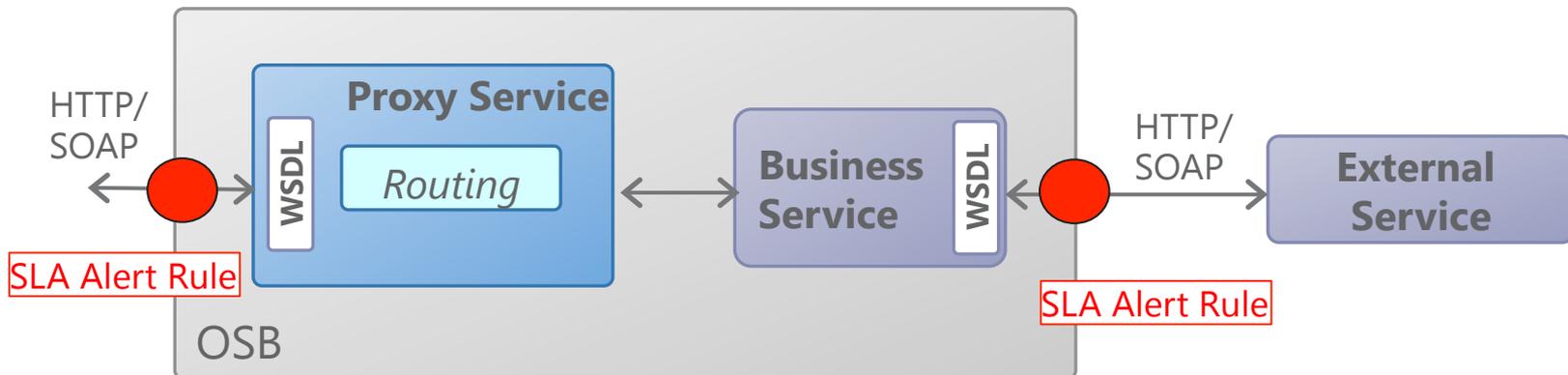
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SLA Alert Rules

Requirement

- Need a low-overhead way to measure Service Level Agreements (SLAs)

Solution

- Use the *SLA Alert Rules* of the OSB monitoring framework to measure
  - Min/max response time, message count, error count

- Can be added to a simple pass-through service with minimal overhead or on any other "more complex" service
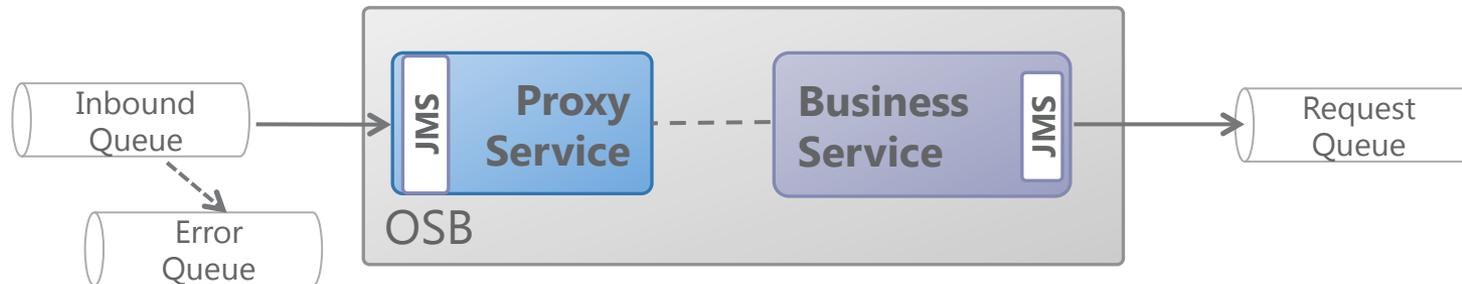
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Reliable Message Processing

Requirement

- Have to make sure that a message is processed. If not, either retry or store it in an error area

Solution

- Use the JMS Transport and integrate the OSB flow in a global transaction

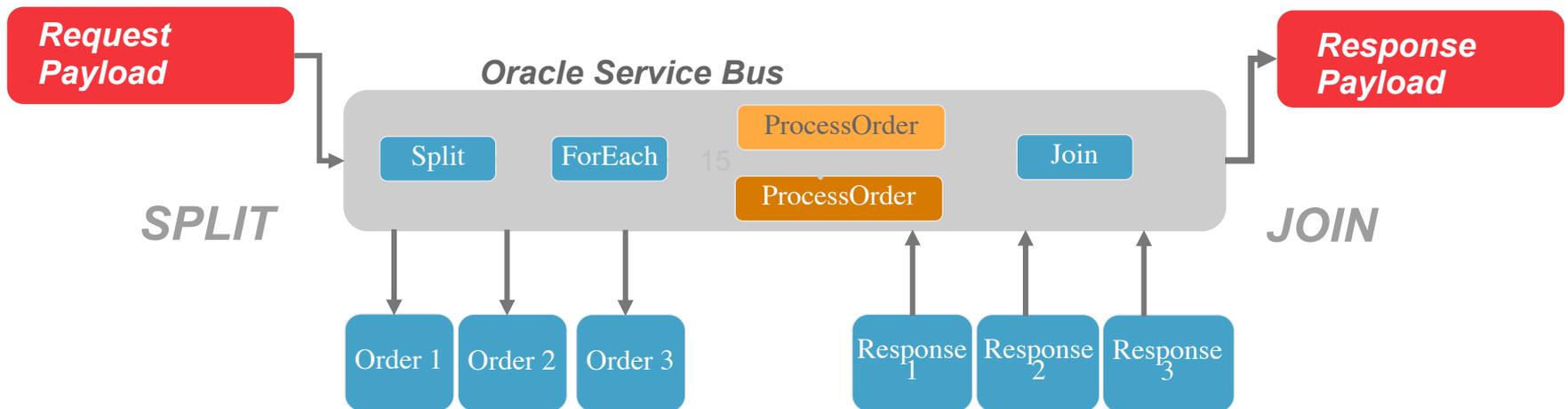- Configure retry and error behavior on the Inbound Queue or on the proxy service

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Split-Join

Requirement

- Process a large message with many sub-items as quick as possible

Solution

- Use a Split-Join to split the large message into many smaller messages and handle them in parallel.

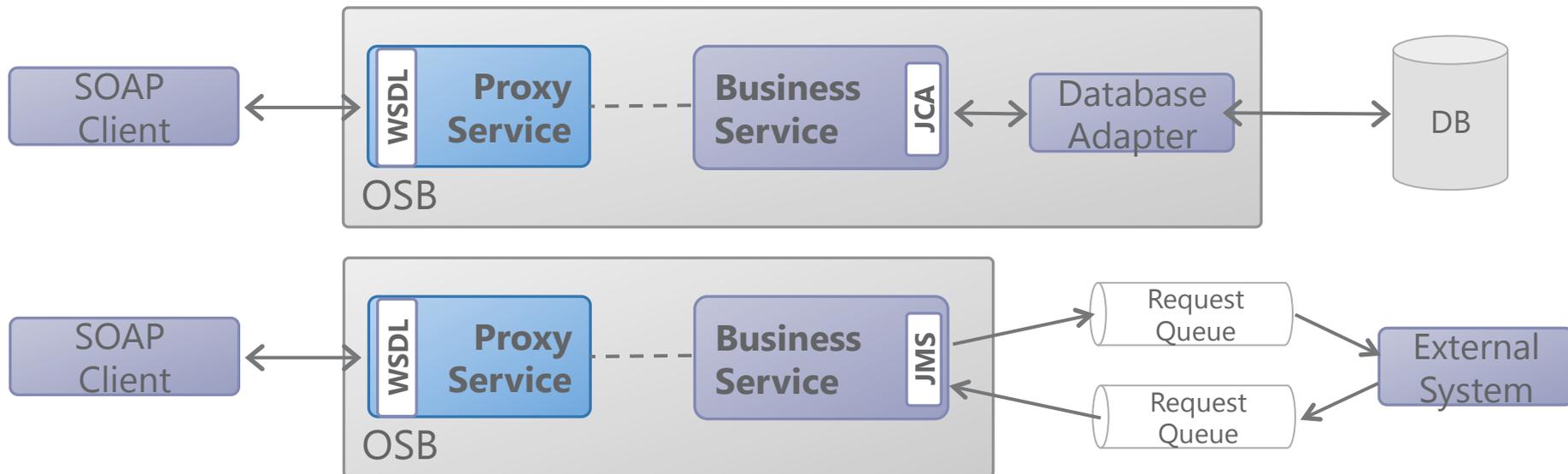- Aggregate the results into one large response message

Integrate with Legacy Systems

Requirement

- Reuse existing legacy functionality and make it available as a Web Service

Solution

- Use the JCA adapter to integrate the legacy systems through the SOA Suite technology adapters,
  - such as the AQ, Database, File and FTP adapters / EJB, JMS, File, FTP Transport
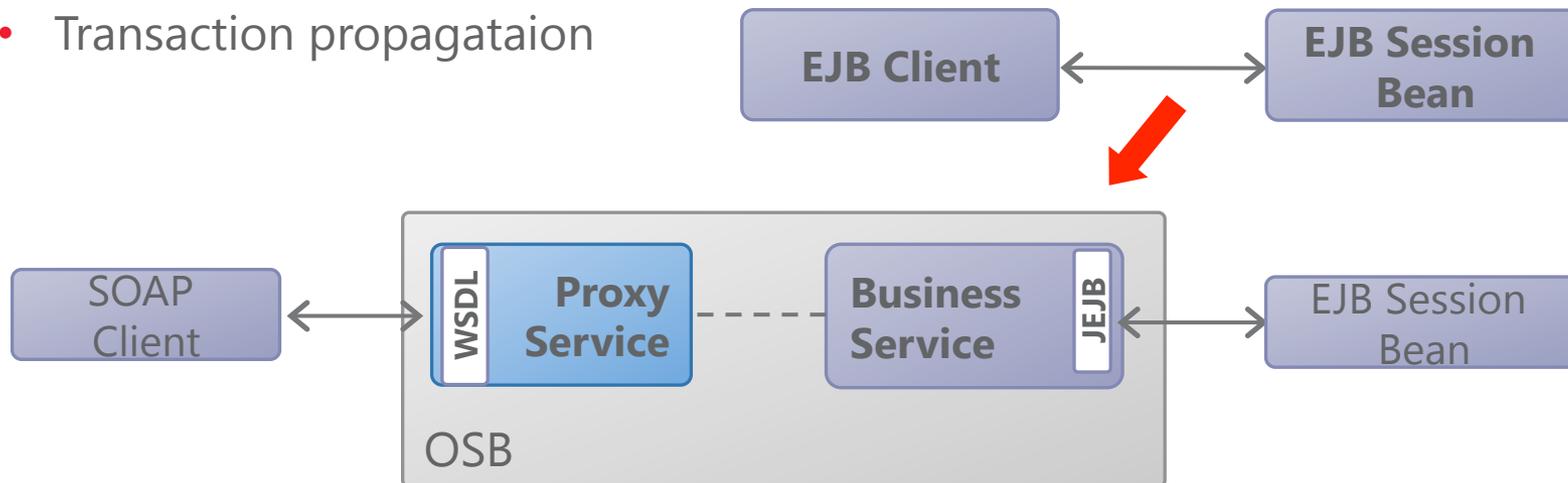
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Directly use existing Java functionality

Requirement

- Make existing EJB functionality available as a Web Service

Solution

- Use the *EJB transport* to access the EJB and expose through a WSDL based proxy service

- Transaction propagataion

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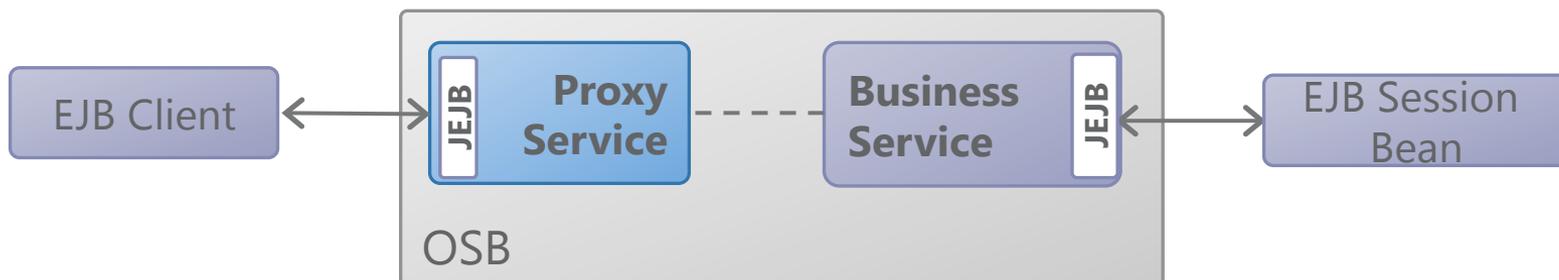# Decouple EJB based systems with JEJB Transport

Requirement

- An existing system consists of a lot of EJB components which are strongly coupled

Solution

- Use the JEJB transport on both ends of the OSB to decouple EJB consumer form the EJB provider

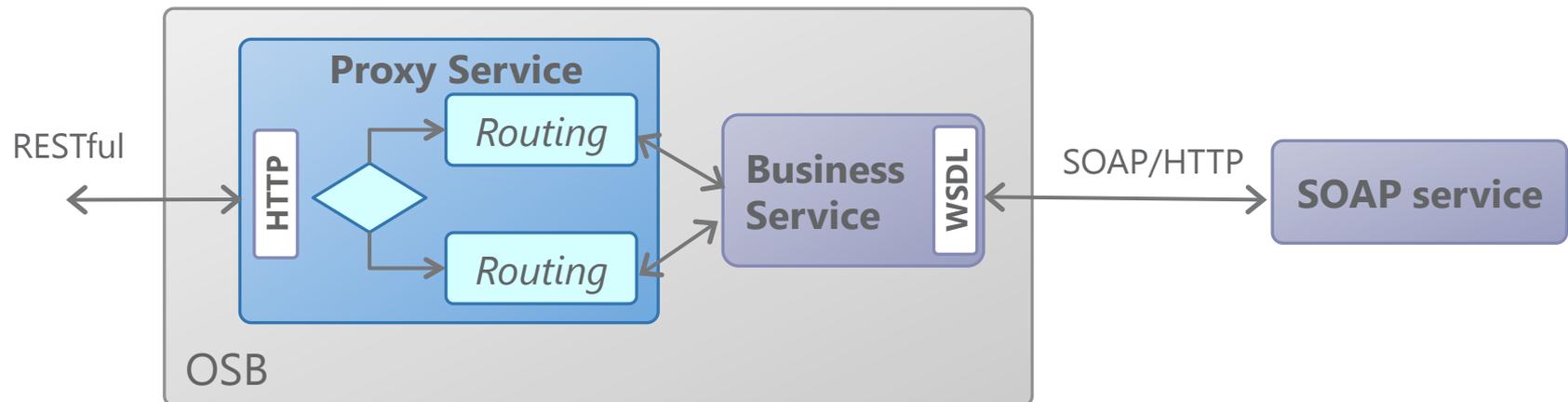- Optionally change the request and/or response message

Expose a SOAP Web Service with a RESTful interface

Requirement

- Need to expose a given functionality through a RESTful interface

Solution

- Use the HTTP transport on the proxy service to accept RESTful calls

- Map the HTTP methods GET/PUT/POST/DELETE to the SOAP operations, using a conditional branch

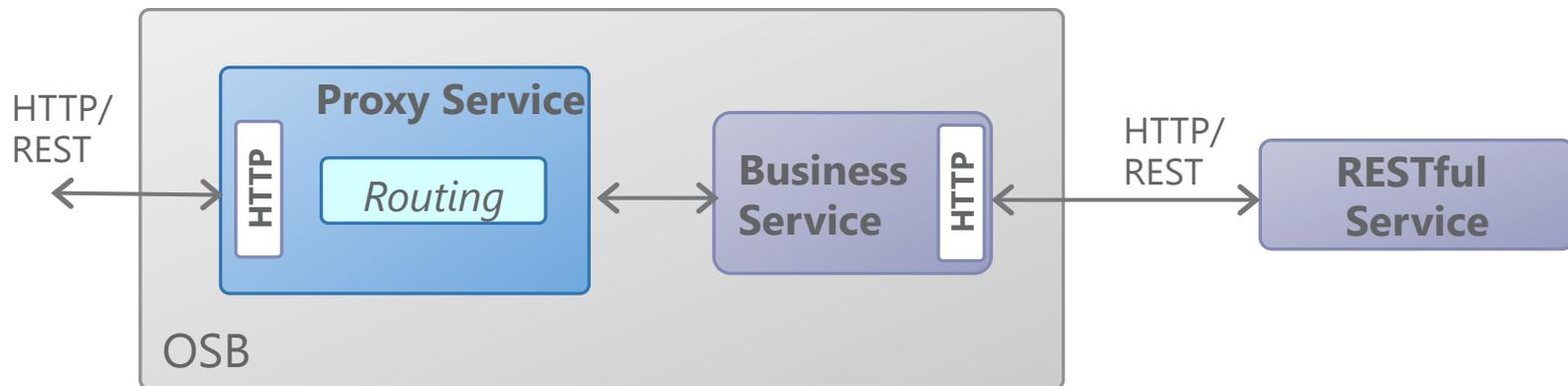# RESTful Services on OSB

Requirement

- Need to decouple RESTful client from its RESTful service provider

Solution

- Use a pass-through service with the HTTP

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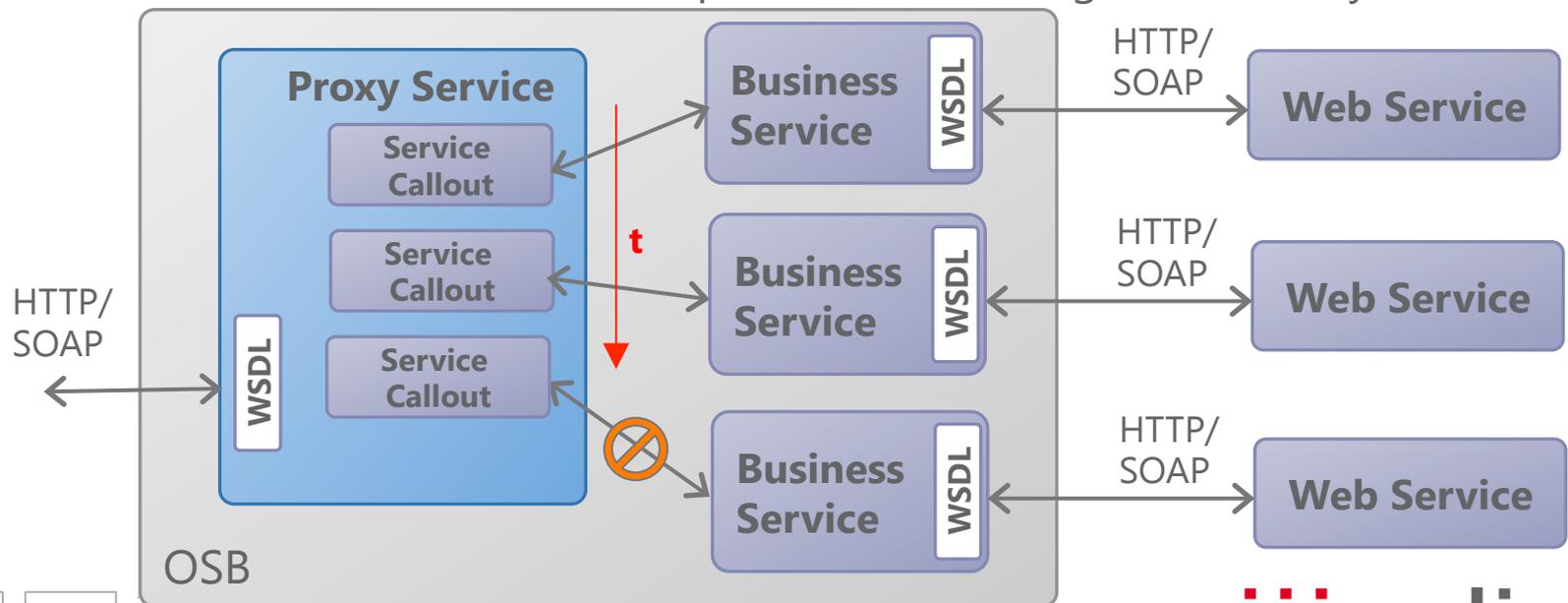makes **IT** easier.

Bad Practice – „Complex" Service Orchestration

Problem

- Calling multiple Web Services through a chain of Service Callout's (all sync)

- If one service call fails, a rollback of the others might be necessary, but we are not in a global transaction

Alternative

- Use BPEL or BPMN with the built-in compensation handling functionality

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Bad Practice – Complex Business Logic in Proxy Message Flow

Problem

- Complex business logic is implemented in OSB through a combination of loops, conditions, expressions and XQuery scripts

Alternative

- Externalize complex business logic into a "real" service or into a Business Rule Engine
  - invoke it as a service from the OSB

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Bad Practice – Java Callout invoking business logic

Problem

- The Java Callout action is used to invoke business logic wrapped in a JAR

Alternative

- Implement this logic as a "real" service and invoke it from the OSB through a business service
  - Either as an Java Web Service or as an EJB session bean through the EJB transport

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Bad Practice – Batch processing

Problem

- Using the OSB for batch processing

- The DB adapter is used to read all the data from one database, passed through the OSB to update it on another database

Alternative

- Use a traditional data integration solution such as Oracle Data Integrator

DB

DB Adapter

JCA **Proxy Service**

Business Service JCA

DB Adapter

DB

OSB

10'000s of records

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Oracle SOA Platform

Entwicklung	Ausführung	Monitoring/Management/Governance
JDeveloper		

Ausführung

- Business Activity Monitoring (BAM)
- Complex Event Processing (CEP)
- BPMN | BPEL | Business Rules | Human Workflow | Spring
- Mediator | Event Delivery Network (EDN)
- Service Infrastructure (SCA)
- Oracle Service Bus | Oracle Enterprise Gateway | Oracle Data Integrator
- Healthcare Integration
- B2B Engine
- Adapter (JCA)
- Oracle WebLogic Server

Entwicklung

- JDeveloper
- Eclipse
- Document Editor
- JDeveloper

Monitoring/Management/Governance

- Enterprise Repository
- Service Registry
- Web Service Manager
- Oracle Service Bus Console
- Healthcare Console
- B2B Console
- Enterprise Manger
- WebLogic Console

Lizenzierung:

- WebLogic Suite
- Oracle SOA Suite
- Oracle Service Bus
- Other products

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OSB vs. Mediator vs. BPEL

Value Mapping
Cross-Reference Tables (XREFs)
Message Validation (Schematron)
Rule-engine for routing

Mediator 11g

EDN
Resubmit
Instance Monitoring
JDeveloper **SCA Support**
Fault Management Framework
Unit Test Framework
Strong typing (XSD)

Message Ordering

**Process State/
Long running**

Process Orchestration

Human Workflow

Decision Service

BPEL/
BPMN

Service Data Object (SDO)

Compensation
Parallel Processing

Sensors

Security
XA Support
Message Filter

Message Validation (XSD)
Asynchronous Messaging Pattern
Message Transformation (XSLT)
Adapter Framework (JCA)
Message Routing

**Graphical Flow
Design**

Split-Join

Reliable Messaging

Service Types and Transport

Service Pooling (Load Balancing)

XQuery Transformation **Message Throttling**

Result Set Caching **REST Support**

OSB

Web Console **Eclipse IDE**

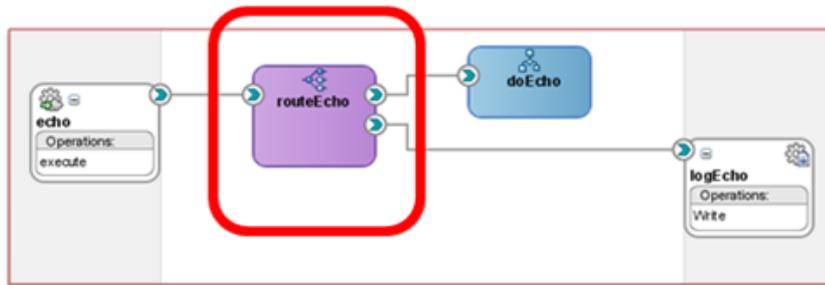**Graphical Debugger**

SLA Alert Rule

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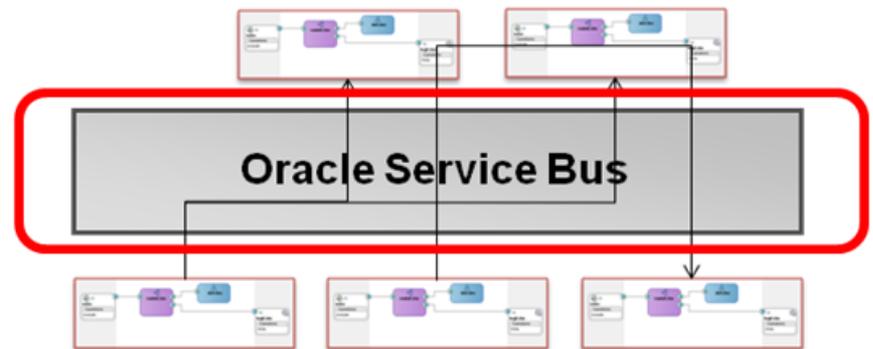# Oracle Service Bus vs. Mediator component

Mediator

- Loosely coupling inside SOA composite

- Intra composite

- Event Delivery Network
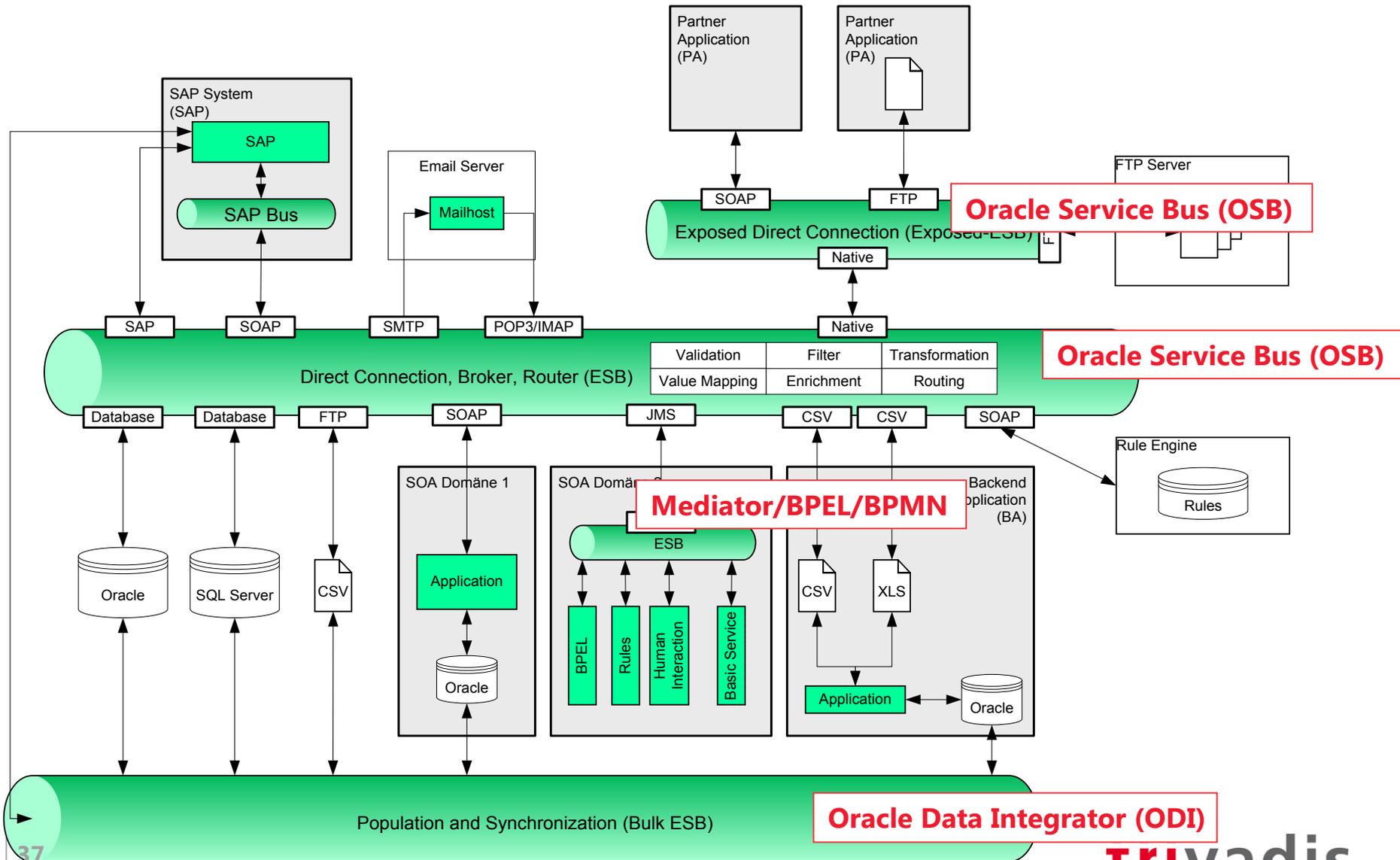
- Domain Value Maps

- Cross Referencing

Oracle Service Bus

- Service virtualization

- Decoupling of SOA domains

- Only entry point for external system

- powerful, standalone ESB

- Service Level Agreements

- Message-oriented solutions

- Integration of legacy systems

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Summary

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Summary

- Use the Oracle Service Bus for Service Virtualization

- Use the Oracle Service Bus for Message-Oriented Solutions

- Do **not** use it to implement service business logic

- Do **not** use it to implement process logic (technical integration processes and/or business processes)

- Do **not** use it to implement batch processing logic

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Thank You!

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Five Cool use cases for the Spring component of the Oracle SOA Suite
Monday 3th December at 11:50 - 12:35 - Executive 7

NoSQL Databases for Implementing Data Services – Should I Care?
Tuesday 4th December at 15:10 - 16:10 - Hall 10a

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